



Designation: C 480 – 99

## Standard Test Method for Flexure Creep of Sandwich Constructions<sup>1</sup>

This standard is issued under the fixed designation C 480; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

### 1. Scope

1.1 This test method covers the determination of the creep characteristics and creep rate of sandwich constructions loaded in flexure, at any desired temperature.

1.2 The values stated in SI units are to be regarded as the standard. The inch-pound units given may be approximate.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

C 393 Test Method for Flexural Properties of Flat Sandwich Constructions<sup>2</sup>

### 3. Significance and Use

3.1 The determination of the creep rate provides information on the behavior of sandwich constructions under constant load. Creep is defined as deflection under constant load over a period of time beyond the initial deformation as a result of the application of the load. Deflection data obtained from this test method can be plotted against time, and a creep rate determined. By using standard specimen constructions and constant loading, the test method may also be used to evaluate creep behavior of sandwich panel core-to-facing adhesives.

3.2 This test method provides a standard method of obtaining flexure creep of sandwich constructions for quality control, acceptance specification testing, and research and development.

### 4. Apparatus

4.1 The apparatus for loading the specimen shall conform to Test Method C 393 except that a constant load shall be applied by means of weights and a lever system. Fig. 1 shows a lever and weight-loading apparatus that has been found satisfactory.

4.2 *Micrometer, gage, or caliper*, capable of measuring accurately to 0.025 mm (0.001 in.).

### 5. Test Specimens

5.1 The test specimen shall be of sandwich construction of a size and proportions conforming to the flexure test specimen described in Test Method C 393.

5.2 The number of test specimens and the method of their selection depend on the purpose of the particular test under consideration, and no general rule can be given to cover all cases. However, when specimens are to be used for acceptance tests, at least three specimens shall be tested.

### 6. Conditioning

6.1 When the test is performed at room temperature and the physical properties of the component materials are affected by moisture, bring the test specimens to constant weight ( $\pm 1\%$ ) before testing, preferably in a conditioning room with temperature and humidity control. The tests, preferably, should be made in a room under the same conditions. A temperature of  $23 \pm 3^\circ\text{C}$  ( $73 \pm 5^\circ\text{F}$ ) and a relative humidity of  $50 \pm 5\%$  are recommended for standard control conditions.

### 7. Procedure

7.1 Measure the dimensions of the specimens in millimetres (inches) to a precision of  $\pm 0.5\%$ .

7.2 The load applied to the specimen by the lever system shown in Fig. 1 may be calculated as follows:

$$P = \frac{WM + wB}{A} + p \quad (1)$$

where:

$P$  = load applied to specimen, N (lb);

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D-30 on Composite Materials and is the direct responsibility of Subcommittee D30.09 on Sandwich Construction.

Current edition approved Oct. 10, 1999. Published February 2000. Originally published as C 480 – 61T. Last previous edition C 480 – 62 (1999).

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 15.03.